State Water Resources Control Board
Order dated May 4, 2016

Provision 12 – Mendocino County RRFCWCID Diversion Forecast Reporting

April 3, 2017

Prepared by

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1 Introduction

This report has been prepared by the Sonoma County Water Agency (Water Agency) to fulfill the requirements of Provision 12 of the State Water Resources Control Board (State Board) Order dated May 4, 2016 (Order) that approved the temporary urgency change petition (TUCP) filed by the Water Agency on April 15, 2016. The TUCP was filed, as required by the Russian River Biological Opinion issued by NOAA National Marin Fisheries Service, to request modifications to the minimum instream flow requirements for the Russian River that are specified in the Water Agency's water-rights Permits 12947A, 12949, 12950 and 16596.

Provision 12 of the Order directs the Water Agency to take the following actions:

> 'To facilitate releases of Lake Mendocino stored water with minimal operational buffers, SCWA shall coordinate with the Mendocino County Russian River Flood Control and Water Conservation Improvement District (District) regarding implementation of a program for real-time 3 day advance forecasts of hourly diversions by all of the District's irrigation and municipal customers under all bases of right. SCWA shall provide an update to the Deputy Director for Water Rights regarding the outcome of consultation and the effectiveness of reporting by April 1, 2017.'

The term of the Order was 180 days from the date of the original order, ending on October 27, 2016.

2 Water Agency Coordination

The Water Agency contacted the Mendocino County Russian River Flood Control and Water Conservation Improvement District (District) on June 8, 2016 to discuss the requirements in Provision 12 and the proposed approach for compliance. A similar order term was included in the State Board's August 25, 2014 order approving the District's 2014 TUCP, as well as the June 17, 2015 order (2015 order) approving the Water Agency's April 2015 TUCP. The District's 2014 TUCP requested changes in place of use to Permit 12947B. The State Board order on the District's 2014 TUCP included a term that required the District to develop a real-time forecasting plan for the District's customers' diversions. The District and Water Agency collaborated to develop an approach and protocols that were intended to provide useful and timely information to improve stream flow predictions and better manage releases from Lake Mendocino. As part of that plan, the Water Agency developed an online diversion forecast reporting tool that allowed District customers to log diversion forecasts from any web browser device with an internet connection. This online reporting tool was retooled and updated for the diversion forecast reporting required under Provision 19 of the 2015 order and only required updated references to be used for the 2016 reporting period.

On June 14, Water Agency staff met with the District's general manager to discuss the implementation of Provision 12 diversion forecast reporting. Forecast reports commenced subsequent to the receipt of the first diversion forecast on July 11, 2016.

3 Diversion Forecast Reporting Program

As discussed in the previous section of this report, the protocols and tool implemented to comply with Provision 12 were based on a diversion forecasting plan developed in 2014 that the District submitted to the State Board. The Water Agency developed an online reporting tool that collected and processed information about the time, duration, location, method and rate of diversions. While the online reporting form only required that each forecasted diversion be identified by river reach, diverters optionally also could identify themselves and the specific locations of their diversions. Because the temporal impacts on stream flows of diversions from river intakes and from wells are different, each diverter was required to describe the method of diversion in the online reporting form. Information for up to five diversion forecasts could be submitted at the same time for a single river reach and single method of diversion. If a diverter's diversions were located on multiple river reaches or if the diverter operated both river intakes and wells, then a separate new online form submittal was required for each river reach and each type of diversion. Reporting protocols were established under which submittals of forecasted hourly diversions would be provided by District customers for the upcoming period of 72 hours from the daily forecast report process time at 8:00 a.m.

A screenshot of the initial webpage of the online reporting tool is included as Attachment 1. Based on the submitted forecast information, the Water Agency processed the data and developed a daily forecast report for Water Agency Operations staff.

4 Daily Forecast Reports

Daily forecast reports began on July 12, 2016 and ran through October 27, 2016. Each daily forecast report charted hourly stream flow data for the Upper Russian River gages and hourly diversion forecasts over a 10-day period. Each period included the 72-hour forecast and previous 7-day history. Each daily report listed the total reported diversions forecasted during that 10-day period and a comparison of the total of the diversions calculated from the forecasts to the expected diversions during that period. Attachment 2 includes an example of the daily forecast report that was prepared for Water Agency Operations staff.

The completeness of diversion forecasts being reported under each daily report was estimated by comparing the 10-day period total reported forecast to the total expected diversions for that period based on a monthly average daily diversion volume. A four-year average of monthly diversion data from 2010 through 2013 as reported on the District's permittee progress reports for Permit 12947B was used as the basis of comparison. The calculated average monthly diversions and the total diversion forecasts reported are shown in Table 1.

Table 1: Estimated Monthly Diversions Assumed for RRFC Customers

	July	August	September	October	Total
Estimated Total Diversions (ac-ft)	1,350	1,150	900	750	4,150
Total Forecasted Diversions (ac-ft)	253	263	60	118	695
Estimated Percentage Represented by Reported Diversions	19%	23%	7%	16%	17%

5 Program Review

A summary of the daily river conditions over the reporting period and the forecasted diversions is included as a chart in Attachment 3. The daily average recorded stream flows at the river gages and the total diversions forecasted for the District's service area are plotted and provided in tabular format. As shown in Table 1, during the full period of diversion forecast reporting, it was estimated that forecasts were provided for about 17% of the total estimated diversions by District customers. The primary reason for this relatively small percentage is that only a relatively small percentage of the District's contractors participated in the program.

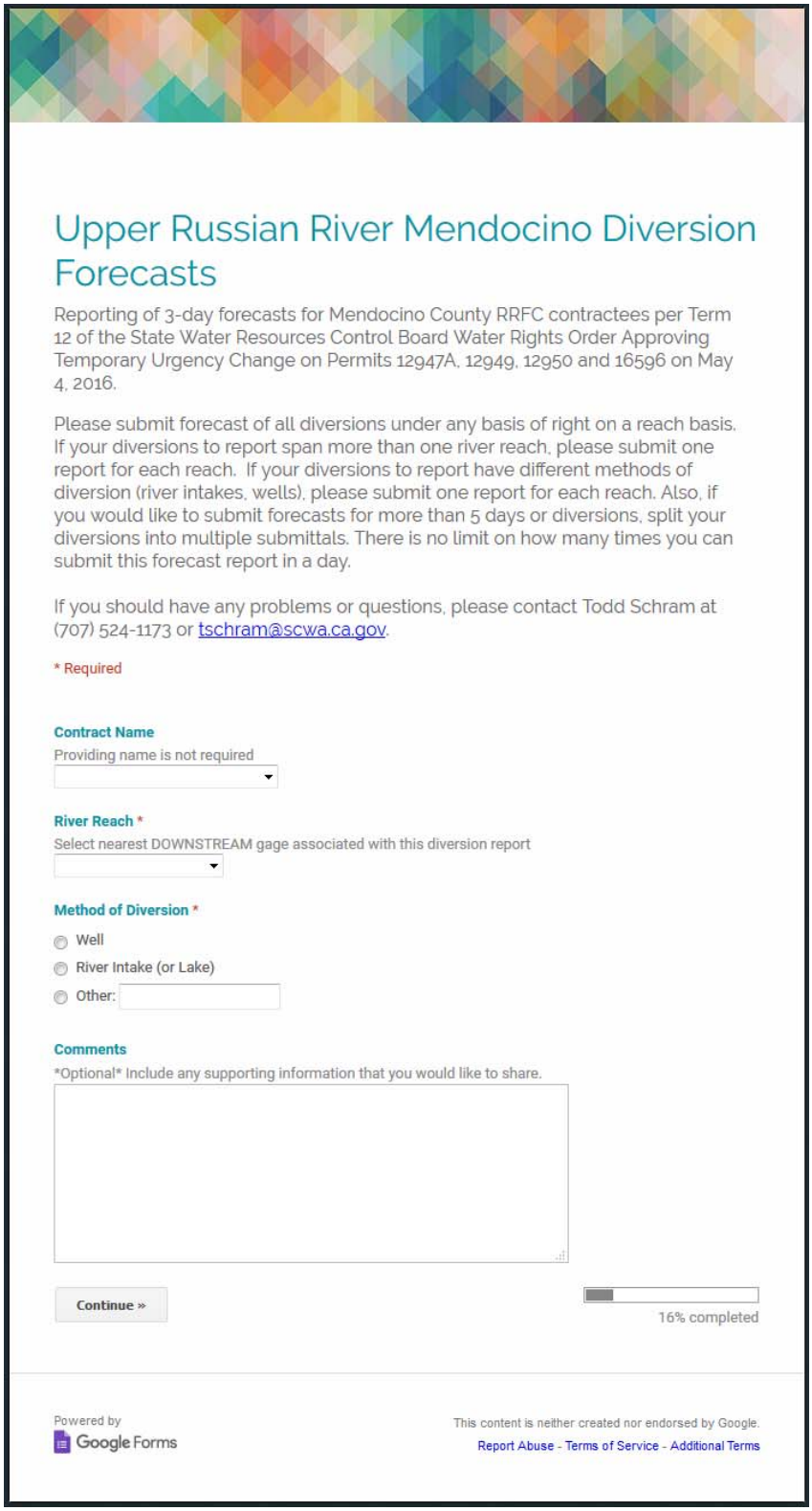
Even if all District contractors were to participate in the diversion forecast program, it still would underestimate total diversions under all water-right claims, because there are diversions under other water-right claims that would not be included in the program. This point is illustrated by Table 2. This table shows the monthly observed losses over the three listed river reaches. The total reported diversions that were forecasted represent about 7% of the total observed losses (695/9,844 = 0.07). If all diversions in the Upper Russian River by District customers were reported, forecasts would be expected to represent about half of the total observed reach losses. The remainder of the observed losses may be attributed to other surface water diversions, groundwater pumping and recharge, evaporation, and riparian corridor vegetation.

Table 2: Observed Monthly Reach Losses in 2016 (ac-ft)

Reach	July	August	September	October	Total
Forks-Talmage	1,895	2,228	1,590	863	6,575
Talmage-Hopland	762	1,230	639	277	2,908
Hopland-Cloverdale	221	60	68	13	361
Total	**2,877**	**3,518**	**2,297**	**2,112**	***9,844***

During the summer of 2016, Water Agency Operations staff consulted the daily forecasted diversion reports when evaluating river conditions and setting reservoir release rates. However, for these daily forecasted diversion reports to be very useful for Water Agency Operations staff, there would have to be much higher participation rates by diverters with District contracts, a similar program for diverters that do not have contracts with the District, and more-detailed information regarding the timing of the effects of the pumping various wells on surface flows in the river.

Attachment 1 – Online Diversion Forecast Reporting Tool for 2016



Upper Russian River Mendocino Diversion Forecasts

Reporting of 3-day forecasts for Mendocino County RRFC contractees per Term 12 of the State Water Resources Control Board Water Rights Order Approving Temporary Urgency Change on Permits 12947A, 12949, 12950 and 16596 on May 4, 2016.

Please submit forecast of all diversions under any basis of right on a reach basis. If your diversions to report span more than one river reach, please submit one report for each reach. If your diversions to report have different methods of diversion (river intakes, wells), please submit one report for each reach. Also, if you would like to submit forecasts for more than 5 days or diversions, split your diversions into multiple submittals. There is no limit on how many times you can submit this forecast report in a day.

If you should have any problems or questions, please contact Todd Schram at (707) 524-1173 or tschram@scwa.ca.gov.

* Required

Contract Name
Providing name is not required

River Reach *
Select nearest DOWNSTREAM gage associated with this diversion report

Method of Diversion *
- Well
- River Intake (or Lake)
- Other:

Comments
Optional Include any supporting information that you would like to share.

Continue »

16% completed

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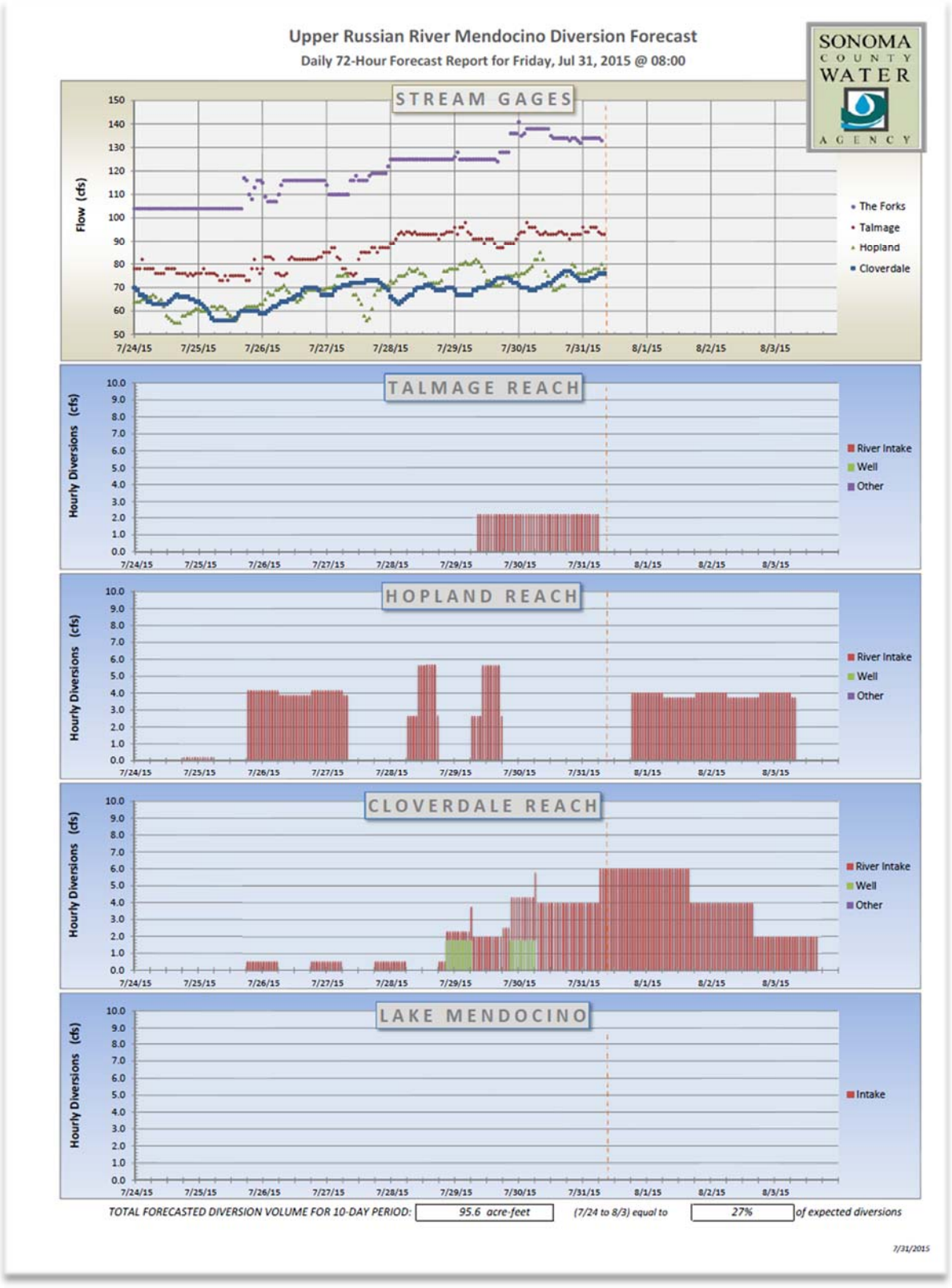
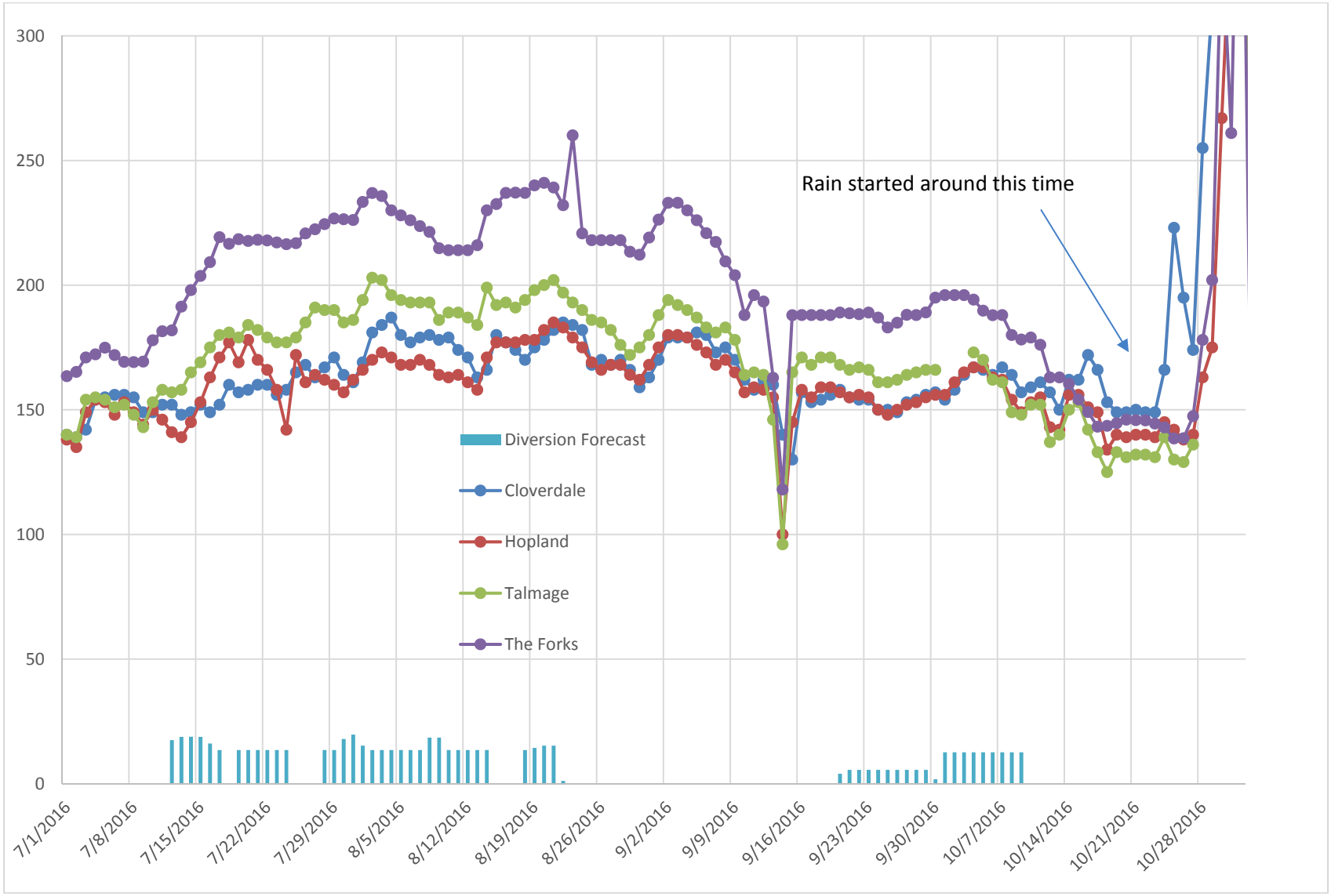
Attachment 2 – Example of Daily Diversion Forecast Report



Attachment 3 – Summary of Daily River Gage Flow Rates and Reported Forecast Diversions



	USGS Gage Stream Flow				Forecasted Diversion Total	
Date	The Forks (cfs)	Cloverdale (cfs)	Hopland (cfs)	Talmage (cfs)	(cfs)	(ac-ft)
7/1/2016	164	140	138	140	0.1	0.2
7/2/2016	165	139	135	139	0.1	0.2
7/3/2016	171	142	149	154	0.1	0.2
7/4/2016	172	154	154	155	0.1	0.2
7/5/2016	175	155	153	154	0.1	0.2
7/6/2016	172	156	148	151	0.1	0.2
7/7/2016	169	156	153	152	0.1	0.2
7/8/2016	169	155	149	148	0.1	0.2
7/9/2016	169	149	144	143	0.1	0.2
7/10/2016	178	149	150	153	0.1	0.2
7/11/2016	182	152	146	158	0.1	0.2
7/12/2016	182	152	141	157	8.8	17.5
7/13/2016	191	148	139	158	9.5	18.8
7/14/2016	198	149	145	165	9.5	18.9
7/15/2016	204	152	153	169	9.5	18.8
7/16/2016	209	149	163	175	8.1	16.2
7/17/2016	219	152	171	180	6.8	13.5
7/18/2016	217	160	177	181	0.1	0.2
7/19/2016	218	157	169	179	6.8	13.5
7/20/2016	218	158	178	184	6.8	13.5
7/21/2016	218	160	170	182	6.8	13.5
7/22/2016	218	160	166	179	6.8	13.5
7/23/2016	217	156	158	177	6.8	13.5
7/24/2016	216	158	142	177	6.8	13.5
7/25/2016	217	165	172	179	0.1	0.2
7/26/2016	221	168	161	185	0.1	0.2
7/27/2016	222	163	164	191	0.1	0.2
7/28/2016	224	167	162	190	6.8	13.5
7/29/2016	227	171	160	190	6.8	13.5
7/30/2016	226	164	157	185	9.0	17.9
7/31/2016	226	161	162	186	9.9	19.7
8/1/2016	233	169	166	194	7.7	15.3
8/2/2016	237	181	170	203	6.8	13.5
8/3/2016	236	184	173	202	6.8	13.5
8/4/2016	230	187	171	196	6.8	13.5
8/5/2016	228	180	168	194	6.8	13.5
8/6/2016	226	177	168	193	6.8	13.5
8/7/2016	224	179	170	193	6.8	13.5

	USGS Gage Stream Flow				Forecasted Diversion Total	
Date	The Forks (cfs)	Cloverdale (cfs)	Hopland (cfs)	Talmage (cfs)	(cfs)	(ac-ft)
8/8/2016	221	180	168	193	9.3	18.5
8/9/2016	215	178	164	186	9.3	18.5
8/10/2016	214	179	163	189	6.8	13.5
8/11/2016	214	174	164	189	6.8	13.5
8/12/2016	214	171	161	187	6.8	13.5
8/13/2016	216	163	158	184	6.8	13.5
8/14/2016	230	166	171	199	6.8	13.5
8/15/2016	233	180	177	192	0.1	0.2
8/16/2016	237	177	177	193	0.1	0.2
8/17/2016	237	174	177	191	0.1	0.2
8/18/2016	237	170	178	194	6.8	13.5
8/19/2016	240	175	178	198	7.3	14.4
8/20/2016	241	178	182	200	7.7	15.3
8/21/2016	239	182	185	202	7.7	15.3
8/22/2016	232	185	183	197	0.6	1.1
8/23/2016	260	184	179	193	0.1	0.2
8/24/2016	221	182	175	190	0.1	0.2
8/25/2016	218	168	169	186	0.1	0.2
8/26/2016	218	170	166	185	0.1	0.2
8/27/2016	218	168	168	182	0.1	0.2
8/28/2016	218	170	168	176	0.1	0.2
8/29/2016	213	166	164	172	0.1	0.2
8/30/2016	212	159	162	175	0.1	0.2
8/31/2016	219	163	168	180	0.1	0.2
9/1/2016	226	170	175	188	0.1	0.2
9/2/2016	233	179	180	194	0.1	0.2
9/3/2016	233	179	180	192	0.1	0.2
9/4/2016	230	179	179	190	0.1	0.2
9/5/2016	226	181	176	187	0.1	0.2
9/6/2016	221	180	173	183	0.1	0.2
9/7/2016	217	173	168	181	0.1	0.2
9/8/2016	210	175	170	183	0.1	0.2
9/9/2016	204	170	165	178	0.1	0.2
9/10/2016	188	162	157	164	0.1	0.2
9/11/2016	196	158	159	165	0.1	0.2
9/12/2016	193	162	158	164	0.1	0.2
9/13/2016	163	160	155	146	0.1	0.2
9/14/2016	118	140	100	96	0.1	0.2
9/15/2016	188	130	145	165	0.1	0.2

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Date	The Forks (cfs)	Cloverdale (cfs)	Hopland (cfs)	Talmage (cfs)	(cfs)	(ac-ft)
9/16/2016	188	157	158	171	0.1	0.2
9/17/2016	188	153	155	168	0.1	0.2
9/18/2016	188	154	159	171	0.1	0.2
9/19/2016	188	156	159	171	0.1	0.2
9/20/2016	189	158	157	168	2.0	4.0
9/21/2016	189	155	155	166	2.8	5.5
9/22/2016	188	154	156	167	2.8	5.5
9/23/2016	189	154	155	166	2.8	5.5
9/24/2016	187	150	150	161	2.8	5.5
9/25/2016	183	150	148	161	2.8	5.5
9/26/2016	185	149	150	162	2.8	5.5
9/27/2016	188	153	152	164	2.8	5.5
9/28/2016	188	154	153	165	2.8	5.5
9/29/2016	189	156	155	166	2.8	5.5
9/30/2016	195	157	156	166	0.9	1.8
10/1/2016	196	154	156	n/a	6.4	12.6
10/2/2016	196	158	161	n/a	6.4	12.6
10/3/2016	196	164	165	n/a	6.4	12.6
10/4/2016	194	167	167	173	6.4	12.6
10/5/2016	190	166	167	170	6.4	12.6
10/6/2016	188	164	163	162	6.4	12.6
10/7/2016	188	167	162	161	6.4	12.6
10/8/2016	180	164	154	149	6.4	12.6
10/9/2016	178	157	149	148	6.4	12.6
10/10/2016	179	159	153	152	0.1	0.2
10/11/2016	176	161	155	152	0.1	0.2
10/12/2016	163	157	143	137	0.1	0.2
10/13/2016	163	150	142	140	0.1	0.2
10/14/2016	160	162	156	150	0.1	0.2
10/15/2016	154	162	156	153	0.1	0.2
10/16/2016	149	172	151	142	0.1	0.2
10/17/2016	143	166	149	133	0.1	0.2
10/18/2016	144	153	134	125	0.1	0.2
10/19/2016	145	149	140	133	0.1	0.2
10/20/2016	146	149	139	131	0.1	0.2
10/21/2016	146	150	140	132	0.1	0.2
10/22/2016	146	149	140	132	0.1	0.2
10/23/2016	144	149	139	131	0.1	0.2

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10/24/2016	143	166	145	139	0.1	0.2
10/25/2016	139	223	142	130	0.1	0.2
10/26/2016	139	195	138	129	0.1	0.2
10/27/2016	147	174	140	136	0.1	0.2